

For Restricted Circulation only

 SHAKAMBHARI GROUP #SteelWithin		SHAKAMBHARI ISPAT & POWER LTD. (Formerly known as Ess Dee Aluminium Ltd.)	
STANDARD TEST METHOD			
Title: Separation of Layers of Laminate			Page No. 1 of 3
STM No.	Version No.	Effective Date	Next review date
SIPL/STM/010	00	06.07.2026	05.07.2028

1.0 PURPOSE

- 1.1 To define a test method for separation of layers of any laminate such as Alu-Alu, Paper Laminate, Strip Foil, and other laminates.

2.0 SCOPE

- 2.1 This STM applies to the Quality Control department.

3.0 REFERENCE(S) & ATTACHMENTS**3.1 References**

- 3.1.1 In-house

3.2 Attachments

- 3.2.1 Nil

4.0 RESPONSIBILITY**4.1 QC Department Person:**

- 4.1.1 To carry out the testing as per the STM.

4.2 QC Department Head:

- 4.2.1 To prepare and ensure the implementation of the STM.

4.3 QA Head:

- 4.3.1 To approve the new or revised STM, and to ensure the implementation of the defined system.

5.0 DISTRIBUTION

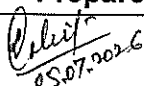
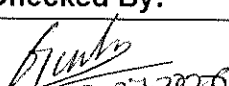
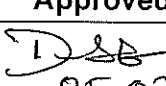
- 5.1 Quality Assurance

- 5.2 Quality Control

6.0 DEFINITION(S) & ABBREVIATION(S)

- 6.1 Definitions: Nil

- 6.2 Abbreviations: Nil

Prepared By:	Checked By:	Approved By:
 05.07.2026	 05.07.2026	 05.07.2026

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STANDARD TEST METHOD

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SIPL/STM/010	00	06.07.2026	05.07.2028

7.0 PROCEDURE**7.1 For Alu-Alu:**

- 7.1.1 Take the sample of Alu-Alu and cut 100 sq. mm to check the total grammage.
- 7.1.2 Check the total grammage and note the reading as (W).
- 7.1.3 Put the sample into a jar having a solution of (70% Water + 30% Acetic Acid). Heat it at 140°C for 1-5 minutes on a hot plate. Remove the sample using a clamp safely and allow it to slightly cool down. Then try separating the OPA layer first, then the PVC layer. If the PVC layer does not get separated, repeat the heating and separate.
- 7.1.4 When each layer is separated, note down the GSM of the individual layers. In the OPA and PVC layers, adhesive will be stuck firmly, hence the adhesive GSM should be subtracted from them. In case the adhesive layers are required to be cleaned or measured accurately, follow the method below for adhesive removal from the separated layers:
 - 7.1.4.1 If the adhesive layer does not remove completely from the nylon and aluminium foil (which can happen in case of maturity of bond), then immerse the delaminated layer of Nylon & Aluminium foil in a freshly prepared solution of Di-Methyl Formamide (100 ml), Methanol (50 ml), Dichloromethane (50 ml).
 - 7.1.4.2 Carefully clean the adhesive from the de-laminated layer of Nylon & Aluminium foil and keep the same on a sufficient size of paper. Dry the cleaned samples of nylon & aluminium foil along with the paper in the mechanical oven below 140°C for 10 minutes. Moreover, ensure that the solvent is completely dried.
 - 7.1.4.3 Take the weight of separated and dried PVC (W1), nylon (W2), and aluminium foil (W3) separately; multiplied by 100 will give the GSM of PVC, nylon, and aluminium foil respectively.
- 7.1.5 To calculate the total GSM of adhesive, the formula is below:
- 7.1.6 $GSM\ of\ adhesive = W - (W1 + W2 + W3)$

7.2 For Paper Laminate:

- 7.2.1 Take the sample of Paper Laminate and cut 100 sq. mm to check the total grammage.
- 7.2.2 Check the total grammage and note the reading as (W).
- 7.2.3 Put the sample into Acetic Acid and place the jar on the hotplate for boiling for about 1-5 minutes until the layers get separated.
- 7.2.4 When each layer is separated, follow the method below for determination of the GSM of each layer: Carefully separate all the layers like sandwich PE, Sealant PE, PET, or Aluminium foil. Dry them well in the oven and take the weight of each separated and dried layer. Mark the layers as W1, W2, W3, W4 respectively; multiplied by 100 will give the GSM. Paper will become saggy, so clean the paper out using cotton.

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7.2.5 To calculate the GSM of the Paper layer, the formula is below:

7.2.6 $GSM \text{ of Paper} = W - (W1 + W2 + W3 + W4)$

7.3 For Strip Foil & Other Laminate:

7.3.1 Take the sample of Laminate and cut 100 sq. mm to check the total grammage.

7.3.2 Check the total grammage and note the reading.

7.3.3 Put the sample into Acetic Acid and place the jar on the hotplate for boiling for about 1-5 minutes until the layers get separated.

7.3.4 When each layer is separated, follow the method below for determination of the GSM of each layer.

7.3.5 Carefully separate all the layers like Poly, PET, Aluminium foil, etc. Dry them well in the oven and take the weight of each separated and dried layer; multiplied by 100 will give the GSM. Mark the layers as W1, W2, W3, W4, and so on.

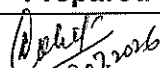
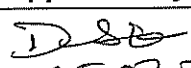
7.3.6 To calculate the GSM of adhesive / ink / coating, the formula is below:

7.3.7 $GSM \text{ of adhesive / ink / coating} = W - (W1 + W2 + W3 \dots \text{ and so on})$

7.3.8 To avoid accidents, all chemical containers must be properly labelled with the full chemical name, not abbreviations, using a permanent marker.

8.0 REVISION HISTORY

Revision No.	00	Effective Date	06.07.2026	CC No.	N/A
Details of revision: New SOP					

Prepared By:	Checked By:	Approved By:
 15.07.2026	 05.07.2026	 05.07.2026